EXHIBIT 1

PUBLIC - REDACTED VERSION

INTENSITY

INTENSITY CORPORATION
12730 High Bluff Drive, Suite 300
San Diego, California 92130
telephone 858.876.9101

www.intensity.com

IN THE UNITED STATES DISTRICT COURT
DISTRICT OF MASSACHUSETTS

EGENERA, INC., Plaintiff, v. CISCO SYSTEMS, INC., Defendant.	Civil Action No. 1:16-CV-11613-RGS **REPORT OF** **Ryan Sullivan, Ph.D.**

Ryan Sullivan, Ph.D.
April 20, 2018

1. Introduction

1.1. Qualifications

(1) I am the Chief Executive Officer of Intensity Corporation ("Intensity") and provide expertise in economics, finance, and statistics. I apply my expertise to solve complex and challenging issues that organizations face in the competitive marketplace and the courtroom.

- Litigation & Disputes. I have wide-ranging experience with the economics of intellectual property and technology, technically demanding analyses of antitrust and competition, robust statistical modeling for labor and employment issues, and detailed quantitative analyses for securities and finance disputes.
- Business Analytics. I develop and implement state-of-the-art predictive models that provide reliable, evidence-based insights into business outcomes. These predictive models are implemented across a spectrum of business challenges, including price optimization, promotional programs, business strategy, forecasting, and investing.

(2) I have been recognized as a top U.S. economic expert by Intellectual Asset Management in 2014, 2015, 2016, 2017, and 2018. I was rated at the top gold-band level reserved for those professionals highest among their peers in the field. According to IAM, "Ryan Sullivan uses sophisticated economic models to solve the trickiest damages conundrums." IAM further commented that the "outstanding academician is celebrated for his creative but rigorous, data driven approach and deep engagement with the questions at hand."

(3) I am often retained to provide expert testimony in high-stakes commercial litigation. I have provided expert testimony in more than a dozen cases that each had more than $1 billion in controversy. I have testified at trial in over 20 cases, provided deposition testimony in approximately 80 cases, and submitted expert reports in nearly 100 cases.

(4) I serve on the Board of Trustees for San Diego Zoo Global, the world's premier, nonprofit zoological organization that operates the San Diego Zoo, Safari Park, Institute for Conservation Research, and the Global Wildlife Conservancy. The mission of San Diego Zoo Global is to save species worldwide by uniting expertise in animal care and conservation science with dedication to inspiring passion for nature.

(5) I am an invited member of the Economics Leadership Council at the University of California, San Diego. In this role, I provide guidance to the Department of Economics faculty on the application of economic science in private industry. In addition, I mentor UC San Diego

testimony. I also reserve the right to provide rebuttal opinions and testimony in response to other experts, and rebuttal testimony in response to any fact witnesses. In connection with my anticipated trial testimony in this action, I may use as exhibits various documents produced in this litigation that refer to or relate to the matters discussed in this report. I have not yet selected any exhibits I may ultimately use. In addition, I reserve the right to use animations, demonstratives, enlargements of actual attachments, and other information in order to convey my opinions.

(14) The entirety of my report, including attachments and referenced materials, supplies the basis for my analysis and conclusions. The organizational structure of the report is for convenience. To the extent that facts, economic analysis, and other considerations overlap, I generally discuss such issues only once for the sake of brevity. Neither the specific order in which each issue is addressed nor the organization of my report or attachments affects the ultimate outcome of my analysis.

1.3. Framework

(15) I understand that in patent-infringement litigation, the patent laws provide for damages to a prevailing patent holder in an amount that compensates for the infringement: "Upon finding for the claimant the court shall award the claimant damages adequate to compensate for the infringement, but in no event less than a reasonable royalty for the use made of the invention by the infringer, together with interest and costs as fixed by the court."[1] For the purposes of my analysis, I assume that the patent-in-suit is valid, enforceable, and infringed.[2]

(16) A reasonable royalty is an amount of money determined by applying sound economic principles to case-specific facts.[3] In 2014, the Federal Circuit confirmed that "there are multiple reasonable methods for calculating a royalty."[4]

(17) One way to determine a reasonable royalty is through an analysis of what a willing licensor and a willing licensee would have bargained for during an arm's-length, hypothetical

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1 35 U.S.C. § 284.

2 To the extent I refer herein to infringement, my reference is always to alleged infringement, whether I explicitly indicate it or not. I express no opinion as to any alleged infringement by the defendant or any non-party.

3 Sullivan, Ryan and John Scherling (2011), "Rational Reasonable Royalty Damages: A Return to the Roots," *Landslide* 4(2): 1–4, at 1.

4 *Apple Inc., v. Motorola, Inc.*, 757 F.3d 1286, 1319 (Fed. Cir. 2014).

2. Marketplace

2.1. Egenera

(20) Egenera is a privately held company that provides wholesale cloud services.[9] Egenera is headquartered in Boxborough, Massachusetts and was founded in 2000.[10] Xterity, Egenera's cloud service, offers Infrastructure as a Service ("IaaS"), Backup as a Service ("BaaS"), Disaster Recovery as a Service ("DRaaS"), and cloud migration.[11] Egenera hosts Xterity in Tier 3 and Tier 3+ datacenters in Boston, Massachusetts; Ashburn, Virginia; San Jose, California; London; Newcastle; Dublin; and Tokyo.[12]

(21) Egenera developed a fabric-based, converged server architecture called Processing Area Network ("PAN") that could "be wired once, and then configured, provisioned, and reconfigured and reprovisioned by software commands rather than physical rewiring."[13] Egenera's first products to embody PAN, developed in the early 2000s, were the BladeFrame, a physical system consisting of control nodes, blade servers, a fabric backpane, and firmware, and the PAN Manager, software that enabled configuration and management of the BladeFrame.[14] Egenera's website lists PAN Manager Software as a key component of its converged infrastructure and cloud management solutions for a variety of applications, including data

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9 Crunchbase Website, Egenera, https://www.crunchbase.com/organization/egenera-inc (accessed 12/14/2017).

Egenera Press Release, "Egenera Teams Up with Brigantia Partners for Xterity Cloud Services Distribution in the UK," 12/4/2017, https://www.egenera.com/2017/12/news-egenera-brigantia/.

10 Egenera Press Release, "Egenera Teams Up with Brigantia Partners for Xterity Cloud Services Distribution in the UK," 12/4/2017, https://www.egenera.com/2017/12/news-egenera-brigantia/.

Egenera Website, About Egenera and Xterity Cloud Services, https://www.egenera.com/about-us-enterprise-cloud-service-providers/ (accessed 12/14/2017).

11 Egenera Press Release, "Egenera Teams Up with Brigantia Partners for Xterity Cloud Services Distribution in the UK," 12/4/2017, https://www.egenera.com/2017/12/news-egenera-brigantia/.

12 Egenera Press Release, "Egenera Teams Up with Brigantia Partners for Xterity Cloud Services Distribution in the UK," 12/4/2017, https://www.egenera.com/2017/12/news-egenera-brigantia/.

13 First Amended Complaint, 3/2/2018, ¶ 11.

14 First Amended Complaint, 3/2/2018, ¶ 12.

4. Accused Products

(36) Egenera alleges that Cisco UCS infringes the '430 patent.[59] According to a 2016 Cisco data sheet, Cisco describes UCS as follows:[60]

> [A] data center platform that unites computing, networking, storage access, and virtualization resources into a cohesive system designed to reduce total cost of ownership . . . and increase business agility. The system integrates a low-latency, lossless 10-Gigabit Ethernet unified network fabric with enterprise-class, x86-architecture servers. The system is an integrated, scalable, multichassis platform in which all resources participate in a unified management domain.

(37) Cisco UCS consists of hardware and software components, including the following:

a. <u>Cisco fabric interconnects</u> provide network connectivity and management capabilities for the system's blade server chassis, blade servers, and rack servers managed by Cisco UCS.[61] All servers attached to the fabric interconnects become part of a single management domain.[62] In addition, the fabric interconnects provide both local area network and storage area network connectivity for all the blade servers in its domain.[63] Currently, a single Cisco UCS domain consisting of two fabric interconnects can accommodate up to 20 chassis comprising up to 160 servers.[64]

b. <u>Cisco UCS Manager</u> is infrastructure management software hosted and run by the fabric interconnects.[65] UCS Manager is bundled with the purchase of Cisco UCS fabric

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59 First Amended Complaint, 3/2/2018, ¶¶ 21, 22, 24–27.

Egenera Amended Preliminary Infringement Contentions, 12/29/2017, at 1.

60 Cisco Website, UCS 6200 Series Fabric Interconnects Data Sheet, 11/7/2016, https://www.cisco.com/c/en/us/products/collateral/servers-unified-computing/ucs-6200-series-fabric-interconnects/data_sheet_c78-675245.html.

61 Cisco Website, UCS 6200 Series Fabric Interconnects Data Sheet, 11/7/2016, https://www.cisco.com/c/en/us/products/collateral/servers-unified-computing/ucs-6200-series-fabric-interconnects/data_sheet_c78-675245.html.

62 Cisco Website, UCS 6200 Series Fabric Interconnects Data Sheet, 11/7/2016, https://www.cisco.com/c/en/us/products/collateral/servers-unified-computing/ucs-6200-series-fabric-interconnects/data_sheet_c78-675245.html.

63 Cisco Website, UCS 6200 Series Fabric Interconnects Data Sheet, 11/7/2016, https://www.cisco.com/c/en/us/products/collateral/servers-unified-computing/ucs-6200-series-fabric-interconnects/data_sheet_c78-675245.html.

64 Cisco Website, UCS 5100 Series Blade Server Chassis Data Sheet, 7/28/2017, https://www.cisco.com/c/en/us/products/collateral/servers-unified-computing/ucs-5100-series-blade-server-chassis/data_sheet_c78-526830.html, at 2.

Cisco, Cisco Unified Computing System, 7/2016, at 12.

65 Cisco Website, UCS Manager Data Sheet, 5/23/2017, https://www.cisco.com/c/en/us/products/collateral/servers-unified-computing/ucs-b-series-blade-servers/data_sheet_c78-520522.html.

5. Accused Sales

(38) Cisco has provided sales data beginning on September 1, 2012 and ending on January 27, 2018. Sales data is provided in fourteen excel files running from CISCO00205848 to CISOC00205861. Appended together, the files include 5,965,142 total observations, with no duplicates.

(39) [redacted]

(40) There are 4,149,381 observations, or approximately 69.6%, with Ship-To, Bill-To, or End-Customer Site Country of "United States."[88] The rest of the observations cover global locations and are not included in my analysis.

(41) Observations in the data include individual components of orders, by customer and order date. The order components, identified by Product ID, include servers, chassis, fabric interconnects, fabric extenders, hard drives and solid-state drives, adapters, power supplies, and other items, many of which correspond to the components of UCS described in Section 4. See Attachment J-3.

(42) [redacted]

[88] Cisco Sales Data (CISCO00205848.xlsx–CISC00205861.xlsx).

[89] Cisco Sales Data (CISCO00205848.xlsx–CISC00205861.xlsx).

[redacted]

(43) A previous version of the sales data was produced in Excel files running from CISCO00083643 to CISCO00083651. Compared to the most recent sales data discussed above, these data contain fewer data fields, end in October 2017, and cover fewer non-U.S. sales, but are otherwise substantively the same as the newer data. Regarding the sales data in CISCO00083643 to CISCO00083651, Cisco project manager Rachitya Raina, a Cisco 30(b)(6) witness on financial and sales data-related topics, testified that she had created it using the FinBi database used by Cisco in the regular course of business to generate financial reports, and that she has no reason to doubt its accuracy.[93] I was able to match the vast majority of U.S. observations in the two data sets, confirming that the newer data are substantially the same as the previous version. Furthermore, Cisco produced the newer sales data in response to an Egenera interrogatory requesting additional data fields for the previous sales data.[94] Thus, it is a reliable data set for quantifying sales of Cisco UCS products.

(44) [redacted]

90 Cisco Sales Data (CISCO00205848.xlsx–CISC00205861.xlsx).

91 Cisco Sales Data (CISCO00205848.xlsx–CISC00205861.xlsx).

92 Cisco Sales Data (CISCO00205848.xlsx–CISC00205861.xlsx).

93 Rachitya Raina, Dep. Tr., 3/14/2018, at 34:16–35:23.

94 Defendant Cisco Systems, Inc.'s Objections and Responses to Egenera, Inc.'s Fourth Set of Interrogatories, 2/26/2018, at Response to Interrogatory 20.

95 [redacted]

96 [redacted]

[redacted]

(45) [redacted]

(46) Based on my calculations of total U.S. UCS revenue and the number of servers sold, I calculate UCS U.S. revenue per server to be [redacted] See Attachment E-3. This is a reasonable estimate of UCS revenue per server that appropriately captures variation across configurations, customers, and time.

(47) I understand that there are two alternative start dates for the damages period: (1) September 2012, when Egenera claims Cisco received constructive notice of the alleged infringement; and (2) August 5, 2016, when the complaint in this matter was filed.[97] Damages are calculated using each potential start date. I reserve the right to calculate damages using a different start date. Damages are calculated through January 27, 2018, the last date for which Cisco has provided sales data. I reserve the right to calculate damages from January 28, 2018 up to the date of trial.

(48) As discussed in Section 4, UCS B-series blade servers are part of the UCS manager domain, while UCS C-series rack servers can be used as part of a UCS Manager domain, or as standalone servers. I was asked to assume that UCS B-series blade servers are necessarily part of a system that infringes the patent-in-suit. I exclude from my analysis rack servers that do not use UCS Manager and any servers potentially used as part of UCS Mini solutions. I also exclude storage and HyperFlex servers from my analysis.

(49) Accordingly, I calculate the number of B-series blade servers sold to all customers in the sales data. From this number, I subtract blade servers potentially used in a UCS Mini solution. I do this by calculating the number of model-6324 fabric interconnects sold. See Attachment J-4. As discussed in Section 4, for each 6324 fabric interconnect, up to eight blade servers may be used. Thus, I estimate the number of blade servers that may be used in UCS Mini configurations by multiplying the number of 6324 fabric interconnects recorded in the sales data by eight. This number is an upper bound, since not all customers may use the maximum number of blade servers in the UCS Mini configuration. I treat the total number

[97] Egenera, Inc.'s Supplemental Objections and Responses to Cisco Systems, Inc.'s First Set of Interrogatories (Nos. 4-5), 4/3/2018, at Response to Interrogatory 5, First Supplemental Response to Interrogatory 5.

of blades sold, net of those potentially used in a UCS Mini solution, as the blade server unit base. See Attachment E-5.

(50) I also calculate the number of rack servers sold to all customers in the sales data. From this number, I exclude rack servers that may potentially be used in a UCS Mini configuration. To estimate this value, I multiply the number of 6324 fabric interconnects in the data by seven, since a 6324 fabric interconnect may accommodate up to seven rack servers, as discussed in Section 4. I exclude [redacted] of the remaining rack servers, using Cisco's estimate of the share of rack servers that are used as standalone servers, *i.e.* without UCS Manager. The result is the rack server unit base. See Attachment E-5.

(51) The overall unit base of blade and rack servers equals [redacted] for the period from September 1, 2012 through January 27, 2018. See Attachment E-5.

(52) I have been asked to consider an alternative infringement scenario. The scenario is that Egenera may not be able to collect damages on UCS sales to federal government entities. Accordingly, I provide a reasonable royalty estimate for this scenario, for the two potential damages start dates discussed above. See Section 16. For this scenario, I exclude from my analysis all sales to End Customer Global Ultimate ID's that correspond to federal government entities. See Attachment E-5. Government entities identified in my analysis include those that were listed by Cisco in its interrogatory response, as well as other entities that are identifiable as federal government.[98] See Attachment J-10.

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[98] Defendant Cisco Systems, Inc's Second Supplemental Objections and Responses to Plaintiff Egenera, Inc.'s First Set of Interrogatories (Nos 1, 7, 10, 11, 12, 13), 12/11/2017, at First Supplemental Response to Interrogatory 11 (Renumbered 16).

Note that the interrogatory response names Arrow Electronics, Inc. among federal government entities; I do not exclude these sales from my calculations, because Arrow Electronics is a reseller entity.

6. Hypothetical Negotiation

(53) A reasonable royalty can be determined through an analysis of what a willing licensor and a willing licensee would have bargained for during an arm's-length hypothetical negotiation occurring on the eve of infringement.[99]

(54) I understand that the date of the hypothetical negotiation for the '430 patent would be the eve of first infringement by Cisco, which allegedly occurred in or around July 2009, when Cisco first released UCS.[100] The hypothetical negotiation would occur between Egenera as the licensor and Cisco as the licensee.

99 *Applied Med. Resources Corp. v. U.S. Surgical Corp.*, 435 F.3d 1356, 1361 (Fed. Cir. 2006).

Rite-Hite Corp. v. Kelley Co., Inc., 56 F.3d 1538, 1554 (Fed. Cir. 1995).

State Indus., Inc. v. Mor-Flo Indus., Inc., 883 F.2d 1573, 1580 (Fed. Cir. 1989).

100 Defendant Cisco Systems, Inc.'s Supplemental Objections and Responses to Egenera, Inc.'s First, Second, Third, and Fourth Sets of Interrogatories (Nos. 1–22), 3/16/2018, at Response to Interrogatory 5.

Cisco publicly announced the UCS family of products on March 16, 2009. See:

Defendant Cisco Systems, Inc.'s Supplemental Objections and Responses to Egenera, Inc.'s First, Second, Third, and Fourth Sets of Interrogatories (Nos. 1–22), 3/16/2018, at Response to Interrogatory 5.

Cisco Website, "Cisco Unleashes the Power of Virtualization with Industry's First Unified Computing System," 3/16/2009, https://newsroom.cisco.com/press-release-content?type=webcontent&articleId=4826917.

Jefferies, "Armies Boosting Arsenal For Data Center Battles," 3/18/2009, at 1.

[redacted]

(60) Benefits of UCS to the customer include: 1) reduction, simplification, and standardization of cabling, 2) absence of gateways that cause bottlenecks and are a source of incompatibilities, 3) reduced power and cooling, and 4) reduced cost.[121] For example, UCS reduces the number of required devices and centralizes switching resources by eliminating switching inside a chassis.[122] As a result, switches, cables, adapters, and management points are reduced by up to two-thirds.[123] This results in lower power and cooling requirements, and fewer management points, which leads to increased reliability.[124] According to the Cisco website, Cisco UCS can "streamline data center resources, scale service delivery, and radically reduce the number of devices requiring setup, management, power and cooling, and cabling."[125] A 2016 IDC study commissioned by Cisco about the business value of Cisco UCS on Big Data states that "the cost-effective and operationally efficient nature of the Cisco UCS played a substantial role in . . . organizations' decisions to use Cisco UCS."[126]

(61) The cost-saving benefit of UCS to customers is manifested as total cost of ownership ("TCO")[127] savings. Total cost of ownership measures total cost in terms of initial expenses as well as

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118 Sidney Morgan, Dep. Tr., 3/9/2018, at 59:17–19, 156:25–157:6.

119 Sidney Morgan, Dep. Tr., 3/9/2018, at 103:4–104:4, Exhibit 6 (CISCO00062576, at 9).

120 Sidney Morgan, Dep. Tr., 3/9/2018, at 104:9–16, Exhibit 6 (CISCO00062576, at 9).

121 Cisco, Project California: a Data Center Virtualization Server, 2009 (EGENERA00005976–06263, at EGENERA00006061).

122 Cisco, Cisco UCS Manager GUI Configuration Guide, Release 1.x, 6/25/2009, at 3.
Cisco, Project California: a Data Center Virtualization Server, 2009 (EGENERA00005976–06263, at EGENERA00006015).

123 Cisco, Cisco UCS Manager GUI Configuration Guide, Release 1.x, 6/25/2009, at 3.
Cisco, Project California: a Data Center Virtualization Server, 2009 (EGENERA00005976–06263, at EGENERA00006015).

124 Cisco, Project California: a Data Center Virtualization Server, 2009 (EGENERA00005976–06263, at EGENERA00006015).

125 Cisco Website, Unified Computing Technology, https://www.cisco.com/c/en/us/products/servers-unified-computing/technology.html (accessed 12/14/2017).

126 IDC, The Business Value of Cisco UCS Integrated Infrastructure for Big Data, 2/2016, at 9.

127 Scott Clark, Dep. Tr., 3/8/2018, at 228:18–20.

expenses over the product's lifetime.[128] TCO considers the full impact on IT expenditure, including capital expenditures, such as the purchase of hardware and software, and operational expenses, such as hardware and software maintenance, administration, power and cooling, space, and other service and labor costs.[129] The TCO savings of UCS are derived through reduced overall system complexity, reduced power consumption, more efficient use of space and cabling, reduced points of management, and lower number of system components needed, among other features.[130]

(62) [redacted]

128 Cisco Website Blog, "Why TCO is the Only True Way to Measure Network Costs," 10/6/2011, https://blogs.cisco.com/partner/why-tco-is-the-only-true-way-to-measure-network-costs.

129 Peter Avioli, Dep. Tr., 2/27/2018, at 25:8–17, 47:15–22.

Cisco Website Blog, "Why TCO is the Only True Way to Measure Network Costs," 10/6/2011, https://blogs.cisco.com/partner/why-tco-is-the-only-true-way-to-measure-network-costs.

Cisco Website, UCS Business Value – TCO Presentation, c. 2010, at 3, https://www.cisco.com/c/dam/global/hr_hr/assets/MACIEJ_BOCIAN_UCS_Business_value_ROI_TCO.pdf.

130 Cisco UCS Partner/Reseller Version Proposal Template, undated (CISCO00028771.doc, at 3).

Cisco California presentation, undated (CISCO00093571.ppt, at 23).

131 Sidney Morgan, Dep. Tr., 3/9/2018, at 83:16–84:6.

132 Sidney Morgan, Dep. Tr., 3/9/2018, at 95:2–97:14, Exhibit 6 (CISCO00062576, at 9).

133 Accelerating the Transformation to Next Generation Data Center, undated (CISCO00045602.pptx, at 31).

134 Sidney Morgan, Dep. Tr., 3/9/2018, at 85:1–86:3.

(63) Cisco customer case studies, customer reviews, and technical documents demonstrate that the UCS technology also contributes significant value and TCO savings to Cisco's customers. For example:

a. [redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

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[redacted]

[redacted]

7.2. The ’430 patent

(64) The technology claimed in the ’430 patent generally relates to defining, deploying, and managing a virtual network of servers.[165] The ’430 patent is “directed to solving problems in manually configuring, deploying, and maintaining enterprise and application servers” and “discloses ‘a processing platform from which virtual systems may be deployed through configuration commands.’”[166]

(65) Prior to the invention claimed in the ’430 patent, configuring, deploying, and maintaining enterprise servers and applications was a lengthy, manual, costly, and often complex

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160 Cisco Customer Case Study, “Education Company Moves Data Center to the Cloud, Saves Big,” 2011, at 1–2.

161 Cisco Customer Case Study, “Software Provider Cuts Operating Costs by Standardizing Data Centers,” 2011, at 1–2.

162 Cisco Customer Case Study, “Delivering Better, Greener Education Services,” 2011, at 1, 3.

163 Cisco Customer Case Study, “Holmesglen TAFE Reduces Server Hardware Costs by 30%, Uses 50% Less Space in the Data Centre,” 2010, at 1, 3.

164 Cisco Customer Case Study, “Holmesglen TAFE Reduces Server Hardware Costs by 30%, Uses 50% Less Space in the Data Centre,” 2010, at 1.

165 Interview with Mark Jones. See Attachment A-4.

166 Memorandum and Order on Claim Construction, 2/5/2018, at 2.

8. Commercial Relationship

(87) At the time of the hypothetical negotiation, Cisco UCS competed with Egenera's BladeFrame product line. As the BladeFrame, which incorporated PAN Manager, was Egenera's only product at the time of the hypothetical negotiation,[245] Egenera would have expected a substantial royalty from Cisco in exchange for a license to use the same technology that enabled Egenera to differentiate its own products in the marketplace in a directly competing product.

(88) Prior to the launch of UCS, Egenera's patent-embodying products proved successful in the marketplace. Egenera's revenues, which derive substantially from the sale of patent-embodying products, totaled hundreds of millions of dollars between 2001 and the start of 2009.[246] Multiple third parties had validated the value of Egenera's patented technology by partnering with Egenera.[247] Further, Egenera had received consistent industry recognition and acclaim, beginning shortly after the launch of its BladeFrame and PAN Manager products.[248]

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245 Egenera Website, Products, accessed via Internet archive (as displayed on 8/17/2009), https://web.archive.org/web/20090817142011/http://www.egenera.com:80/products-egenera-systems.htm (accessed 4/16/2018).

246 See Attachment D-3.

247 See, for example:

Egenera-Dell Memorandum of Understanding, 12/21/2007 (EGENERA00873845–872).

Egenera-Fujitsu OEM Agreement, 8/31/2005 (EGENERA00962820–850).

248 See, for example:

Egenera Press Release, "Egenera's BladeFrame System Named Winner of a Best of Show Award For NetWorld+Interop 2001 Atlanta," 10/24/2001, accessed via Internet Archive (as displayed on 6/3/2002), https://web.archive.org/web/20020603112834/http://www.egenera.com:80/display_pr.php?id=52.

Egenera Press Release, "Egenera Recognized as one of '10 Start-ups to Watch for 2002' by Network World," 4/29/2002, accessed via Internet Archive (as displayed on 6/10/2002), https://web.archive.org/web/20020610082119/http://egenera.com:80/display_pr.php?id=77.

Egenera Press Release, "Egenera Named to the Red Herring 100," 5/13/2002, accessed via Internet Archive (as displayed on 10/8/2002), https://web.archive.org/web/20021008114229/http://www.egenera.com:80/display_pr.php?id=78.

Egenera Press Release, "YankeeTek Ventures Names Egenera CEO Vern Brownell Innovator of the Year," 9/22/2003, accessed via Internet Archive (as displayed on 10/2/2003), https://web.archive.org/web/20031002172941/http://egenera.com:80/display_pr.php?id=149.

Free Library Website, "Egenera Named AO100 Winner for Fourth Conservative Year by AlwaysOn," 7/14/2006, https://www.thefreelibrary.com/Egenera+Named+AO100+Winner+for+Fourth+Consecutive+Year+by+AlwaysOn.-a0148180160.

10. Royalty Structure

(104) A reasonable royalty is an amount of money determined by applying sound economic principles to case-specific facts.[340] It is the amount of royalties, not the royalty structure *per se*, that is relevant for the evaluation of economic damages in this case. As described herein, a reasonable royalty is calculated as an amount of money based on the apportioned value driven by the specific contribution of the patent-in-suit in the United States during the damages period.

(105) The informative royalty amount could, in practice, be structured as a running royalty (a percentage or a per-unit amount), as an equivalent lump sum applicable to the relevant time period, or some combination of the two. Any of these structures could be informative so long as the royalty amount is commensurate with the economic benefits resulting from the alleged infringement of the patent-in-suit.

(106) In this case, a running, per-unit royalty structure has certain economic advantages that are relevant to the facts of this case and the parties involved. First, a running royalty structure allows for payments to be commensurate with the actual economic benefits that Cisco derives from commercialization of the patented technology. The benefits Cisco receives from using the patented technology increase as sales of the accused products increase. Second, a running royalty structure allows for payments to be commensurate with the actual contributions of the technology over time, which may grow or shrink due to marketplace factors and other factors. Third, a running royalty structure allows for the sharing between licensor and licensee of risks associated with overpayment or underpayment relative to the value earned in the marketplace on accused products.[341]

(107) At the hypothetical negotiation, the parties would agree to a royalty structure that considers the value contribution of the claimed invention to UCS. A per-unit royalty provides a reasonable means of metering economic benefits of the patented technology in a way that is reflective of its scale and usage. Thus, the parties at the hypothetical negotiation would likely agree to a per-unit royalty structure.

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340 Sullivan, Ryan and John Scherling (2011), "Rational Reasonable Royalty Damages: A Return to the Roots," *Landslide* 4(2): 1–4, at 1.

341 Razgaitis, Richard (2003), *Valuation and Pricing of Technology-Based Intellectual Property*, New Jersey: John Wiley & Sons, Inc., at 299. ("[Running royalties] provide an opportunity for the seller to receive more than the parties would have or could have expected because the outcome of the license has been greater than expected. Likewise, they can be an advantage to the buyer if the market turns out to be much smaller than expected.")

(108) As discussed in Section 7.2, the '430 patent is directed at deploying, managing, and scaling a system of servers through the use of unified fabric and software. The number of servers deployed in a given UCS configuration directly reflects the scale of the system and its usage. Thus, the number of servers is commensurate with and reflective of the use and benefits of the patented technology. Accordingly, structuring the per-unit royalty on a per-server basis is appropriate and applicable to the facts of this case. A per-server royalty is convenient for the parties to administer, [redacted].[342] A per-server royalty measures the share of the value of UCS apportioned to the specific contributions of the technology claimed in the '430 patent. It does not represent a royalty on servers; rather, the number of servers provides a mechanism for measuring the extent of use and benefits of the patented technology. Alternative per-unit measurement bases could provide an alternative unit of scale, yet should result in the same amount of royalties.

342 Rachitya Raina, Dep. Tr., 3/14/2018, at 34:16–35:19.

12. Technology Apportionment

(135) The economic benefit of the technology claimed in the ’430 patent can be measured by the value that it confers on Cisco’s customers. As discussed in Section 7, one of the most significant benefits that the claimed technology offers to UCS customers is TCO savings. [redacted]

(136) In addition to benefitting Cisco UCS customers, TCO savings provide significant benefits to Cisco. First, as discussed above, TCO reduction was one of the key advantages of UCS that allowed Cisco to enter the server marketplace. Second, as discussed above, TCO savings are a top benefit of UCS from the vantage point of customers, and hence one of the key drivers of demand for UCS. Third, reduction in TCO afforded by UCS has allowed Cisco to charge a premium for its servers.[388]

(137) Thus, the value of UCS can be apportioned to the economic benefits of the patented technology by using the share of TCO savings that are caused by the technology claimed in the ’430 patent.

(138) In Cisco marketing documents, TCO savings are measured and broken up into categories, including server hardware and warranty; switching/networking, cabling, and warranty; power and cooling; provisioning and administration; and systems management software.[389] Server

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387 UCS Market Assessment, 5/8/2015 (CISCO00065675.ppt, at 26).

388 [redacted]

Cisco Website, “Blade Server TCO and Architecture – You Cannot Separate Them,” 9/10/2013, https://blogs.cisco.com/datacenter/blade-server-tco-and-architecture-you-cannot-separate-them. (“The acquisition cost difference between server vendors is irrelevant….What makes or breaks data center economics are the OpEx costs (primarily management) and these significantly impact business success and profitability.”)

389 See, for example:

Cisco Unified Computing System (UCS): Changing the Economics of the Datacenter, 8/1/2013 (CISCO00064309.pptx, at 5–6).

Cisco Unified Computing System (UCS): Changing the Economics of the Data Center, 9/2015 (EGENERA00004768.pdf, at 4).

cost savings are driven by the elimination of I/O adapters and the reduction in the number of servers.[390] Elimination of I/O adapters is enabled by Cisco UCS Virtual Interface Cards and Unified Fabric, while the reduction in the number of servers is due to the combination of UCS Service Profiles, the elimination of management servers, large memory footprints, and improved virtualization.[391] Switching and cabling cost savings are driven by Unified Fabric, which allows for fewer switches and therefore fewer cables.[392] Power and cooling cost savings are enabled by UCS' reduction in servers, switches, adapters, and cables, along with UCS Manager's power management.[393] Provisioning and administration cost savings are driven by UCS Manager and UCS Service Profiles.[394] Systems management cost savings are fueled by the elimination of systems management licensing and management servers, which is enabled by UCS Manager.[395]

(139) The technology claimed in the '430 patent is the essence of UCS.[396] To Dr. Jones' knowledge, if not for the technology claimed in the '430 patent, Cisco would not have had a viable virtual server deployment and management system such as UCS.[397] As discussed in Section 7.2, the technology claimed in the '430 patent provides for an integrated or unified fabric for simplified server provisioning and management/administration. Reductions in provisioning and administration costs enabled by UCS are caused by the technology claimed in the '430 patent.[398] Reductions in systems management costs enabled by UCS are caused by the technology claimed in the '430 patent.[399] Accordingly, I use the share of TCO savings that is

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Cisco UCS Advantage Source Book, 1/7/2013 (CISCO00028904.pptx, at 61–79).

390 Cisco Unified Computing System (UCS): Changing the Economics of the Datacenter, 8/1/2013 (CISCO00064309.pptx, at 8).

391 Cisco Unified Computing System (UCS): Changing the Economics of the Datacenter, 8/1/2013 (CISCO00064309.pptx, at 8).

392 Cisco Unified Computing System (UCS): Changing the Economics of the Datacenter, 8/1/2013 (CISCO00064309.pptx, at 17).

393 Cisco Unified Computing System (UCS): Changing the Economics of the Datacenter, 8/1/2013 (CISCO00064309.pptx, at 39).

394 Cisco Unified Computing System (UCS): Changing the Economics of the Datacenter, 8/1/2013 (CISCO00064309.pptx, at 42).

395 Cisco Unified Computing System (UCS): Changing the Economics of the Datacenter, 8/1/2013 (CISCO00064309.pptx, at 58).

396 Interview with Mark Jones. See Attachment A-4.

397 Interview with Mark Jones. See Attachment A-4.

398 Interview with Mark Jones. See Attachment A-4.

399 Interview with Mark Jones. See Attachment A-4.

due to provisioning and administration cost savings, plus the share attributable to systems management cost savings, as an estimate of the contribution of the patented technology to the overall economic benefit of UCS.

(140) My analysis does not include other categories of TCO savings, including power and cooling, and switching, warranty and cabling, that also capture benefits enabled in part by the technology claimed in the ’430 patent.[400] As discussed in Section 7.2, the ’430 patent addresses the problems of over-provisioning, that is, purchasing too many servers due to uncertainty in demand, and of the need for significant cabling in legacy systems. I do not include these additional categories in my analysis; therefore, my estimate is a reasonable lower bound.

(141) The average share of TCO savings due to provisioning and administration cost savings plus systems management cost savings across 15 Cisco case studies is [redacted]. See Attachment G-1. Accordingly, [redacted] represents the portion of the economic benefit of UCS that is attributable to the technology claimed in the ’430 patent, on average.

400 Interview with Mark Jones. See Attachment A-4.

13. Cost Savings Approach

13.1. UCS TCO savings

(142) As discussed in Sections 7.1 and 12, one of the most significant benefits that the technology claimed in the '430 patent provides to UCS customers is TCO savings. Accordingly, I perform a cost savings analysis to determine the economic benefit of the claimed technology as measured by the share of TCO savings that a customer derives from UCS that is attributable to the claimed technology.

(143) To determine an estimate of TCO savings that a customer derives from UCS, I utilize Cisco's UCS TCO-ROI Advisor. The TCO-ROI Advisor is an online tool that estimates how much customers can reduce data center capital and operating expenses by deploying UCS.[401] Specifically, the TCO-ROI Advisor compares the three-year capital and operating costs of maintaining an existing non-Cisco server and network environment to the costs over the same time period of a new Cisco UCS solution with Cisco UCS blade and/or rack servers and integrated unified fabric networking.[402] The TCO Advisor measures the benefit of the UCS solution by calculating the difference in TCO between the two environments and the return on capital investment (ROI) in the proposed Cisco UCS solution.[403]

(144) The TCO Advisor includes a variety of inputs that may be modified to fit the user's specifications, including "Number of physical servers," "Cisco server model," "Cisco processor," "Cisco RAM model," "Cisco RAM Quantity," "Existing Environment – Host server form factor," and others.[404] As outputs, the Advisor provides "ROI," "Total Savings," "OpEx Savings," and "CapEx Savings" percentages, as well as the three-year TCO comparison of the

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401 Cisco Website, Data Center Value Zone – Tools, https://www.cisco.com/c/en/us/solutions/data-center-virtualization/data_center_value_zone.html#~tools (accessed 3/27/2018).

Mainstay Website, Cisco UCS TCO-ROI Advisor – Home Page, https://mainstayadvisor.com/Go/Cisco/UCS-TCO-ROI-Advisor/ (accessed 3/26/2018).

Scott Clark, Dep. Tr., 3/8/2018, at 228:8–240:14.

402 Cisco, Cisco UCS TCO-ROI Report, 3/27/2018, at 1.

403 Cisco, Cisco UCS TCO-ROI Report, 3/27/2018, at 1.

404 Mainstay Website, Cisco UCS TCO-ROI Advisor – Calculations Page, https://mainstayadvisor.com/Go/Cisco/UCS-TCO-ROI-Advisor/ (accessed 4/12/2018).

Mainstay Website, Cisco UCS TCO-ROI Advisor – Advanced Inputs Page, https://mainstayadvisor.com/Go/Cisco/UCS-TCO-ROI-Advisor/ (accessed 4/12/2018).

user's existing solution and the UCS solution.[405] The tool also provides the option to download a custom TCO/ROI report that provides a more detailed explanation of the user's TCO savings.[406]

(145) I have analyzed 352 scenarios in the UCS TCO-ROI Advisor and recorded the associated three-year TCO savings for each scenario. The scenarios include all "Cisco server model" options, eleven different "Number of physical servers" ranging from 10 to 200 servers, and both "Existing Environment – Host server form factor" options. For the "Cisco processor" and "Cisco RAM model" inputs, I use the middle of the provided options. The other inputs are kept at the Advisor's default values. See Attachment J-1. I analyze multiple "Cisco server model," "Number of physical servers," and "Existing Environment – Host server form factor" input options because these are the factors most related to the benefits of the '430 patent; as discussed in Section 7.2, many of the benefits of the '430 patent involve scalability and simplified management. The scalability and simplified management benefits of UCS are linked, in part, to reductions in the number of servers in the UCS system.[407]

(146) For each scenario, I divide the three-year TCO savings derived from the TCO-ROI Advisor by the "Number of physical servers" input for that scenario to derive TCO savings per server. Average TCO savings per server range from [redacted] per server for 10-server configurations to [redacted] per server for 40-server configurations. See Attachment H-1.

(147) To select an appropriate estimate of UCS TCO savings per server applicable to this analysis, I estimate the average number of blade and/or rack servers purchased by an individual Cisco UCS customer, [redacted]

(148) [redacted]

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405 Mainstay Website, Cisco UCS TCO-ROI Advisor – Calculations Page, https://mainstayadvisor.com/Go/Cisco/UCS-TCO-ROI-Advisor/ (accessed 4/12/2018).

Cisco, Cisco UCS TCO-ROI Report, 3/27/2018, at 1.

406 Mainstay Website, Cisco UCS TCO-ROI Advisor – Calculations Page, https://mainstayadvisor.com/Go/Cisco/UCS-TCO-ROI-Advisor/ (accessed 4/12/2018).

Cisco, Cisco UCS TCO-ROI Report, 3/27/2018, at 1.

407 Interview with Mark Jones. See Attachment A-4.

[redacted]

(149) As discussed, my estimate of the economic benefit of UCS per server is calculated by dividing the "Total Savings" output from Cisco's TCO-ROI Advisor by the "Number of physical servers" input for the configuration that corresponds to the number of physical servers per customer calculated in the sales data. The "Number of physical servers" option in Cisco's TCO-ROI Advisor refers to the customer's current solution, rather than the Cisco UCS solution. The number of servers per customer computed in the sales data refers to the Cisco UCS solution. Thus, the analysis herein estimates that a customer would replace its existing system's servers with the same number of UCS servers; however, a Cisco UCS solution generally involves as many or fewer servers than a customer's existing solution.[408] To the extent that the UCS solution would deploy fewer servers than a customer's existing system, the observed average of 44.7 Cisco UCS servers per customer would correspond to TCO-ROI Advisor scenarios with more existing non-UCS servers, resulting in a higher TCO savings per server than my estimate. See Attachment H-1.

(150) [redacted]

408 Cisco, Cisco UCS TCO-ROI Report, 3/27/2018, at 2, 6–7.

409 Cisco Unified Computing System TCO Advisor, 11/1/2009 (CISCO00063100.xls, at 'Home').

410 Cisco Unified Computing System TCO Advisor, 11/1/2009 (CISCO00063100.xls, at 'Inputs').

411 Cisco Unified Computing System TCO Advisor, 11/1/2009 (CISCO00063100.xls, at 'Inputs').

[redacted]

(151) I have analyzed 20 scenarios with the 2009 version of the Advisor, including both "Competing System Inputs – System type (blade or rack)" input options and ten different "Number of servers or blades" input options. All other inputs were kept at their default values. Dividing total TCO savings by the inputted number of existing servers results in TCO savings per server for each scenario. The average TCO savings per server across all scenarios from the 2009 Advisor is [redacted] per server, [redacted] See Attachment J-2.

(152) [redacted]

(153) Accordingly, economic benefit of UCS per server of [redacted] is a reasonable and conservative estimate.

13.2. Technology apportionment

(154) As discussed in Section 12, [redacted]% represents the portion of the benefit of UCS that is attributable to the technology claimed in the patent-in-suit. This technology apportionment results in economic benefit per server attributable to the patented technology of [redacted]. See Attachment H-2.

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412 Cisco Unified Computing System TCO Advisor, 11/1/2009 (CISCO00063100.xls, at 'Cost Structures').

413 Cisco Unified Computing System TCO Advisor, 11/1/2009 (CISCO00063100.xls, at 'Inputs').

414 For example: Data Center Knowledge Website, "Six Server Technology Trends: From Physical to the Virtual and Beyond," 12/7/2016, http://www.datacenterknowledge.com/archives/2016/12/07/six-server-technology-trends-physical-virtual-beyond. ("Server technology has come a long way in the last 10 years.")

(155) [redacted]

13.3. Commercialization apportionment

(156) At the time of the hypothetical negotiation in or around July 2009, both Egenera and Cisco had expended efforts to commercialize the technology claimed in the '430 patent. Accordingly, when determining a reasonable royalty for the '430 patent at the hypothetical negotiation, the parties would consider their relative contributions to realizing the benefits of the patented technology. Cisco and Egenera both contributed to the development of the patented technology through their commercialization efforts. Egenera would also require a return on its commercialization investment when granting Cisco a license to the '430 patent, since Egenera would reasonably expect that granting Cisco a license would effectively be a market-exit maneuver, as discussed in Section 8.

(157) Accordingly, I calculate a commercialization apportionment factor to account for Egenera's and Cisco's relative contributions to the commercialization of the patented technology at the time of the hypothetical negotiation. This apportionment ensures that Cisco is given credit for its efforts to bring the technology in the '430 patent to market—*e.g.*, writing software,

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415 Pindyck, Robert and Daniel Rubinfeld (2013), *Microeconomics,* 8th ed., Boston, MA: Pearson, at 299.
Varian, Hal (1992), *Microeconomic Analysis*, 3rd ed., New York, NY: Norton, at 224.

416 Varian, Hal (2003), *Intermediate Microeconomics*, 6th ed., New York, NY: Norton, at 388.

developing hardware, and product testing—and provides further assurance that my analysis is reasonable and conservative.

(158) Egenera contributed to commercialization of the patented technology by way of its research and development ("R&D") efforts to develop the technology claimed in the '430 patent, as well as sales and marketing efforts to commercialize its own products, which practice the technology claimed in the patent-in-suit.[417] [redacted] See Attachments F-1 to F-3.

(159) [redacted]

(160) [redacted] n.[420] Including all earn-out

[417] Egenera's BladeFrame System products and related software practice the '430 patent. See:

Egenera, Inc.'s Supplemental Objections and Responses to Cisco Systems, Inc.'s First Set of Interrogatories (Nos. 4-5), 4/3/2018, at Response to Interrogatory 6, First Supplemental Response to Interrogatory 6, and Second Supplemental Response to Interrogatory 6.

[418] Cisco Press Release, "Nuova Systems Acquisition Marks Another Major Step in Cisco's Data Efforts," 4/9/2008 (CISCO00082216, at 2).

Agreement and Plan of Merger Between Cisco and Nuova, 4/4/2008 (CISCO00144533, at 11–12).

Cisco Internal Memorandum Regarding Nuova Acquisition, 4/8/2008 (CISCO00144531.pdf, at 1–2).

Nuova Acquisition Summary, c. Q12012 (CISCO00157364, at 2).

Business Insider Website, "Why Cisco Has Showered These 3 Men With Billions Of Dollars," 9/21/2014, http://www.businessinsider.com/why-cisco-showered-three-men-with-billions-2014-9. ("Cisco invested $70+ million and Nuova Systems was born… In 2008, Cisco bought Nuova Systems for $678 million.")

[419] Agreement and Plan of Merger Between Cisco and Nuova, 4/4/2008 (CISCO00144533, at 11–12).

[420] Satinder Sethi, Dep. Tr., 3/26/2018, at 47:21–48:24.

Dan Lang, Dep. Tr., 2/28/2018, 131:15–19, 136:8–19.

payments for Nuova, rather than only those made prior to the hypothetical negotiation, yields a higher relative contribution to Cisco, and hence a conservative estimate of damages. The estimate is also conservative because I attribute the total Nuova acquisition cost to Cisco's investment in UCS, although, as discussed in Section 14.1, Nuova developed a switching product (the Nexus 5000 switch) in addition to UCS.

(161) [redacted]

(162) [redacted]

(163) Egenera's relative contribution of the collective Cisco and Egenera contributions is approximately [redacted] and Cisco's relative contribution is the remaining approximately [redacted] See Attachment F-9. Accordingly, apportioning by [redacted] factors out any profit that may be attributable to Cisco's commercialization efforts, and ensures that Egenera receives a return on its commercialization investment. This apportionment would have been acceptable to Cisco at the hypothetical negotiation. [redacted][424] Cisco's [redacted] share of

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421 [redacted]

422 Cisco California Services Presentation v 10.0, c. 2008 (CISCO00036131.ppt, at 12). COGS in Cisco's investment projections includes headcount, depreciation, productivity/capabilities, internal and partner development/training, and software licensing.

Cisco California Services Presentation v 8.0, c. 2008 (CISCO00036117.ppt, at 13–14).

Project California Update Presentation, 3/11/2008 (CISCO00225477.ppt, at 9).

423 This methodology does not assume collaboration between Egenera and Cisco in developing the patented technology. Rather, Egenera's efforts to commercialize its own products and Cisco's efforts to commercialize UCS both contributed to the realization of the economic benefits of the patented technology.

424 Nuova Systems, Inc. Updated Terms and Conditions, 3/8/2007 (CISCO000157363, at 11, Valuation Summary).

profit implies a rate of return that is higher than Cisco's expectation at the time of the hypothetical negotiation.

(164) The resulting commercialization apportionment factor is reasonable because the methodology and values used to calculate it are tied to the specific facts and circumstances of the case as follows:

a. The parties to the hypothetical negotiation. Egenera and Cisco are the parties at the hypothetical negotiation. I use actual Egenera expenses, actual Cisco acquisition costs, and Cisco's internally projected expenses. This is the same information that Egenera and Cisco would consider at the hypothetical negotiation.

b. The accused product. Cisco's actual investment in and acquisition of Nuova is representative of part of its investment in UCS because Nuova is the company that developed UCS (see Section 14.1). [redacted]

c. The technology claimed in the '430 patent. Egenera's sales and marketing expenses and R&D expenses represent its investment in commercializing its own products, which embody the technology claimed in the '430 patent. [redacted]

d. The date of the hypothetical negotiation. With the exception of the Nuova acquisition costs, Egenera's and Cisco's commercialization investments are adjusted to include investments only up until the date of the hypothetical negotiation, which would be in or around July 2009, and do not include investments that occurred after the hypothetical negotiation. The Nuova earn-out payments are included in the calculation because they were projected at the time of the hypothetical negotiation.

(165) [redacted].

other metrics from the acquisition, are informative on Cisco's expectation of a reasonable payment to gain access to the technology developed by Nuova that would become UCS.

14.2. Commercialization apportionment

(169) As discussed in Section 13.3, Cisco paid [redacted] million to acquire Nuova. This payment reflects Cisco's willingness to pay to acquire access to the technology developed by Nuova, including Project California.

(170) Prior to acquisition, Cisco conducted a valuation of Nuova using discounted cash flow (DCF) analysis.[431] DCF analysis measures the present value of future cash flows, to determine their value at the time of analysis.[432] I use Cisco's DCF analysis to determine Cisco's effective payment for Nuova as a share of the total Cisco valuation of Nuova at the time of acquisition. I determine the share to be [redacted]. See Attachment I-1.

(171) I derive the [redacted] ratio using Cisco's total payment for Nuova and total DCF amount. As discussed above, Nuova's products at the time of acquisition included a switch, which became the Nexus 5000 switch, and the server array product that became UCS. Apportioning the payment and DCF to the server array product would not impact the resulting ratio, because the apportionment percentage would be applied to both the payment and the DCF, *i.e.*, the numerator and the denominator. Hence the ratio that I derive is equivalent to the ratio applicable to Project California alone.

(172) [redacted]

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431 Nuova Systems, Inc. Updated Terms and Conditions, 3/8/2007 (CISCO000157363.pdf, at 11). See also:

Dan Lang, Dep Tr., 2/28/2018, at 144:18–151:6.

432 Ross, Stephen A., Randolph W. Westerfield, and Bradford D. Jordan (1993), *Fundamentals of Corporate Finance*, 2nd ed., Burr Ridge, IL: Richard D. Irwin, Inc., at 139, 221.

Brealey, Richard A., Stewart C. Myers, and Franklin Allen (2011), *Principles of Corporate Finance*, 10th ed., New York, NY: McGraw-Hill/Irwin, at 53.

Parrino, Robert, David S. Kidwell, and Thomas W. Bates (2012), *Fundamentals of Corporate Finance*, 2nd ed., Hoboken, NJ: John Wiley & Sons, Inc., at 140.

433 Nuova Systems, Inc. Updated Terms and Conditions, 3/8/2007 (CISCO000157363.pdf, at 11).

[redacted]

(173) [redacted]

14.3. Technology apportionment

(174) I apportion the effective per-server payment to the value of the patented technology using the [redacted] technology apportionment factor discussed in Section 12. This results in a per-server royalty of $1,050. See Attachment I-4.

(175) The acquisition-based per-server royalty estimate is a lower bound because the payment by Cisco for Nuova does not represent an arms-length transaction. Instead, as an early investor in Nuova, Cisco likely received more favorable terms than an external investor would have received. Therefore, Cisco's payment for access to Nuova's technology may understate the royalty that Cisco would agree to pay to license Egenera's patented technology at the hypothetical negotiation.

[434] Nuova Systems, Inc. Updated Terms and Conditions, 3/8/2007 (CISCO000157363.pdf, at 11).

16. Reasonable Royalty

(234) The determination of reasonable royalties herein is based upon the entirety of research and analysis contained throughout my report, including attachments and referenced materials. I have qualitatively and quantitatively addressed the *Georgia-Pacific* factors throughout my report. Section 15 of my report outlines how I have addressed each *Georgia-Pacific* factor, with references to other parts of my report that provide additional detail on the impact of the factor on the determination of a reasonable royalty. The conclusions drawn from the data and information are reasonable estimates of the parties' expectations at the time of the hypothetical negotiation and the resulting royalty. I have implemented two approaches to determine a reasonable royalty. Both approaches reflect my analysis of the *Georgia-Pacific* factors.

(235) [redacted]

(236) The royalty resulting from the cost savings approach would be agreeable to both parties at the hypothetical negotiation, and is conservative, for several reasons including, but not limited to, the following reasons. First, the calculation of the blade and rack server unit base is conservative, since it excludes the maximum number of servers that could be used in a UCS Mini solution, while there is no indication that every UCS Mini customer would use the maximum number of servers with their UCS Mini solution. Second, the technology apportionment factor does not include categories of benefits that are enabled in part by the technology claimed in the '430 patent, and hence is a lower bound. Third, the estimate of TCO savings per server is conservative because the analysis estimates that a customer would replace its existing system's servers with the same number of UCS servers, while server consolidation is likely. Fourth, the commercialization apportionment factor is conservative because it includes Cisco's total payment for Nuova, which lowers Egenera's relative commercialization contribution. Fifth, the royalty estimate does not fully account for the competitive relationship between the parties, which would be a significant consideration at

Attachment A-4

Interview with Mark Jones, Ph.D.

Professor, Department of Electrical and Computer Engineering, Virginia Tech University
Interviewed on April 17, 2018

Items relating to the ’430 patent

The technology claimed in the ’430 patent generally relates to defining, deploying, and managing a virtual network of servers.

Prior to the invention claimed in the ’430 patent, configuring, deploying, and maintaining enterprise servers and applications was a lengthy, manual, costly, and often complex process. For example, deploying new computer servers in an enterprise computing and application service provider environment required personnel from multiple IT functions and/or departments and could take weeks or months to complete. This was increasingly difficult as the systems became larger. As described in the ’430 patent, “when deploying 24 conventional servers, more than 100 discrete connections may be required to configure the overall system. Managing these cables is an ongoing challenge, and each represents a failure point.” Moreover, attempting to mitigate the risk of failure by adding redundancy could double the cabling, exacerbating the problem while increasing complexity and costs. In addition, because of the difficulty in anticipating how much processing power applications would require, managers would over-provision the amount of computational power, resulting in data-center computing resources often going unutilized or under-utilized. Prior to the invention claimed in the ’430 patent, scaling processor capacity and/or migrating to a next generation architecture could create a need for more hardware or software systems, and hence for additional connections. The claimed invention addresses these flexibility, scalability, and availability issues by providing a processing platform from which virtual networks of CPUs may be deployed through software configuration commands.

The technology claimed in the ’430 patent provides a platform for server provisioning, management, and administration which, as embodied in UCS, reduces costs and increases efficiency for UCS customers.

As far as Dr. Jones is aware, if not for the technology claimed in the ’430 patent, Cisco would not have had a viable virtual server deployment and management system such as UCS.

As far as Dr. Jones knows, without the technology claimed in the ’430 patent, a virtual server deployment and management system would not be as efficient or cost-saving as UCS.

Items relating to TCO savings categories enabled by UCS

The technology claimed in the ’430 patent is the essence of UCS.

Reductions in provisioning and administration costs enabled by UCS are caused by the technology claimed in the ’430 patent.

Reductions in systems management costs enabled by UCS are caused by the technology claimed in the ’430 patent.

Other categories of TCO savings, including power and cooling, and switching, warranty and cabling, also capture benefits enabled in part by the technology claimed in the ’430 patent.

Items relating to UCS components

The scalability and simplified management benefits of UCS are linked, in part, to reductions in the number of servers in the UCS system.

Items relating to Egenera licenses

The patent referenced in the Egenera-Acceleron agreement covers technology that is different from the technology claimed in the ’430 patent.

The patent referenced in the Egenera-Consolidated agreement covers technology that is different from the technology claimed in the ’430 patent.

Items relating to non-infringing alternatives

Cisco has alleged that it could produce non-infringing alternatives using architecture described in U.S. Patent No. 6,597,956 (“the ’956 patent”). Cisco’s first alleged non-infringing alternative is as follows: “Cisco could create a non-

infringing alternative by changing its alleged 'virtual' network into the architecture used in the '956 patent — CPUs connected to a VLAN switch." Cisco has not supplied sufficient specificity regarding this alleged alternative for it to be evaluated or demonstrated as non-infringing, viable, available, or acceptable.

Cisco's second alleged non-infringing alternative is as follows: "Cisco could also create a non-infringing alternative by using 'computing grids' of processing resources and storage devices as described in the '956 patent (e.g. using grids of servers and a storage area network) instead of the alleged VLANs in UCS." Cisco has not supplied sufficient specificity regarding this alleged alternative for it to be evaluated or demonstrated as non-infringing, viable, available, or acceptable.

Cisco alleges that it could have implemented a non-infringing alternative based on the architectures as described in U.S. Patent Nos. 6,779,016, 6,816,905 and 6,085,238. Cisco's third alleged non-infringing alternative is as follows: "Prior art references disclose a system that creates computing grids out of a farm of processing devices that […] Cisco could have implemented as a non-infringing alternative in the same manner as described above with respect to the '956 patent." Cisco has not supplied sufficient specificity regarding this alleged alternative for it to be evaluated or demonstrated as non-infringing, viable, available, or acceptable.

Cisco alleges that it could have implemented a non-infringing alternative based on architecture described in the '956, '016, '905 and '238 patents. Cisco's fourth alleged non-infringing alternative is as follows: "Prior art references disclose a control plane that is 'invisible' to the communication network […] that […] Cisco could have implemented as a non-infringing alternative." Cisco has not supplied sufficient specificity regarding this alleged alternative for it to be evaluated or demonstrated as non-infringing, viable, available, or acceptable.

Cisco's fifth alleged non-infringing alternative is as follows: "Many prior art references disclose a combined switch fabric and control node […] that […] Cisco could have implemented as a non-infringing alternative." Cisco has not supplied sufficient specificity regarding this alleged alternative for it to be evaluated or demonstrated as non-infringing, viable, available, or acceptable.

Cisco's sixth alleged non-infringing alternative is as follows: "Cisco UCS could use an external communication network, instead of an external storage network, for

the purpose of accessing and providing storage to UCS servers. For example, cloud storage accessible over the Internet was readily available in 2009 (and has been ever since). In this alternative, Cisco UCS would not include any ability to access storage over Fiber Channel. Cisco could have achieved this alternative with minimal technical effort, as storage accessible over an external communication network was readily accessible in 2009 and Cisco could simply deactivate code pertaining accessing storage over Fiber Channel." This is not an available or acceptable non-infringing alternative to the patented technology.

Cisco's seventh alleged non-infringing alternative is as follows: "Cisco UCS could include local storage (e.g., hard drives) on each server, rather than utilize any form of external storage network for providing storage to servers. The technology to provide local storage on servers was readily available in 2009; indeed, it was common for servers at the time. Cisco could have achieved this alternative with minimal technical effort, as storage local to a server (e.g., hard drives) was readily accessible in 2009 and Cisco could simply deactivate code pertaining accessing storage over Fiber Channel." This is not an acceptable non-infringing alternative to the patented technology.

Dr. Jones is not aware of any other available or acceptable non-infringing alternatives to the patented technology.

Attachment H-1

Average TCO Savings Per Server

Number of Servers	Average TCO Savings Per Server
10	$ 2,354
20	$ 4,879
25	$ 5,857
30	$ 7,052
35	$ 7,815
40	$ 8,748
45	$ 6,459
50	$ 6,572
100	$ 7,109
150	$ 7,490
200	$ 7,466
Average	$ 6,527
Estimate	$ 6,459

Notes and sources:

See Attachment J-1.

Estimate is set equal to the average TCO savings per server for 45 servers,

because the average number of blade and rack servers per 'End Customer Global Ultimate ID' with nonzero blade or rack server units is 44.7.

See Attachment E-6.